Nuclear Energy —an Overview

The U.S. Department of Energy's Office of Nuclear Energy

A plentiful, reliable supply of energy is the cornerstone of sustained economic growth and prosperity.

Nuclear power is the second-largest source of electric power generation in the United States, and existing plants are among the most economic on the grid today.

The demand for energy in the United States is rising much faster than the projected increase in domestic energy production. By 2030, domestic demand is projected to grow almost 50 percent, according to the Energy Information Administration (EIA). Global demand is expected to almost double by 2030, according to EIA's *International Energy Outlook*.

There are only three ways to overcome this projected shortfall:

- Import more energy,
- Improve energy conservation and efficiency, and/or
- Increase domestic supply.

The Administration considered these options when developing its National Energy Policy (NEP). It concluded that increased dependence on oil imports from volatile regions of the world would jeopardize our national and economic security. As imports rise, so does our vulnerability to price shocks, shortages, and disruptions. For that reason, the Administration resolved to:

- Take steps to improve energy conservation and efficiency,
- Increase domestic energy production, and
- Increase the reliability and security of imports.

Consistent with the priorities set forth in the NEP, the President signed the *Energy Policy Act* (EPAct) into law in August 2005. This law is the first comprehensive energy plan in more than a decade. EPAct:

- Encourages energy efficiency and conservation,
- Promotes alternative and renewable energy sources, and
- Encourages the expansion of nuclear energy in the United States.

Over the past 15 years, U.S. utilities have become the best operators of nuclear power plants in the world. Consolidation of plant ownership to a fewer number of excellent operators has made the operation of U.S. plants:

- Safer,
- More cost-effective, and
- More reliable than ever before.

More efficient operation has allowed nuclear plant operators to produce more energy than ever before, adding the equivalent of nearly 10 new nuclear plants to the U.S. grid through efficiency improvements. American plants, which were available to produce energy only 70 percent of the time on average in the early 1990s, are now producing power around 92 percent of the time. Nuclear power plants do not release air pollutants or carbon dioxide in the production of electricity, providing an important option for improving air and environmental quality.

As a result of this success, essentially all U.S. nuclear plants are expected to apply for renewed licenses that will keep most plants in operation into the middle of the century. The Tennessee Valley Authority (TVA) is going a step further and refurbishing a plant that was abandoned in 1985. TVA expects to invest $1.8 billion to bring this 1,200-megawatt plant online in 2007.

The role of the Department of Energy (DOE) is to work with the private sector, our overseas partners, and other agencies to assure that the benefits of nuclear technology continue to contribute to the security and quality of life for Americans—and other citizens of the world—now and into the future. By focusing on the development of advanced nuclear technologies, the Office of Nuclear Energy (NE) supports the Department's goal to develop new generation capacity while making improvements in environmental quality.

NE leads the development of new nuclear energy generation technologies to meet energy and climate goals and advanced, proliferation-resistant nuclear fuel technologies that maximize energy from nuclear fuel, while maintaining and enhancing the national nuclear infrastructure. These activities build on important work started over the last three years to deploy new nuclear plants in the United States by early in the next decade, and to develop advanced, next-generation nuclear technology.

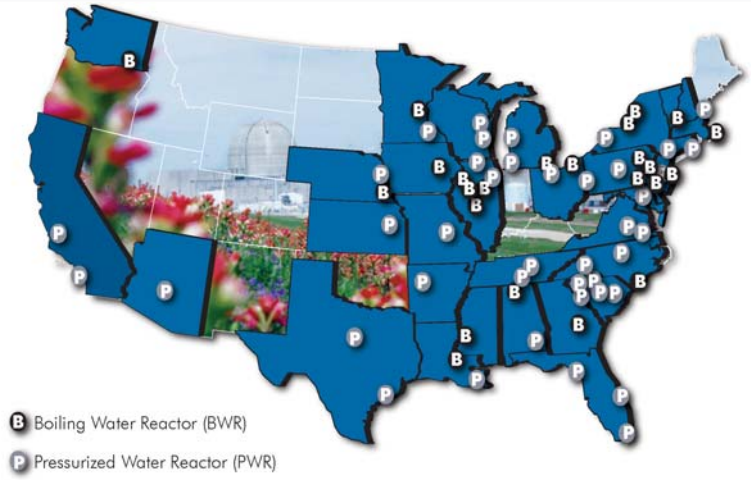
The benefits of nuclear power as a safe, reliable, and affordable source of energy are an essential element in the Nation's energy and environment future. A broadly diverse energy supply has sustained the country in the past, and it must be available for the future. Nuclear energy is part of that diverse portfolio. It can serve us safely and well, as we require more energy to supply our growing economy, work to protect the environment, and enhance America's energy independence.

Program Budget

Nuclear Energy ($ in Millions)

	FY 2007 Request	FY 2008 Request
Nuclear Energy	$632.7	$874.6

Location of 103 U.S. Nuclear Power Reactors



Source: Based on data from the International Nuclear Safety Center, Argonne National Laboratory, GE Nuclear Energy, and other sources.

**Map indicates locations only, some sites have more than one reactor.*